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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/783,035

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Katsuhide Manabe

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07/28/2003

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EXAMINER

NGUYEN, THANH T

ART UNIT

PAPER NUMBER

2813

DATE MAILED: 07/28/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/783,035

Applicant(s)

MANABE ET AL.

Examiner

Thanh T. Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 May 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 18-25 is/are pending in the application.
- 4a) Of the above claim(s) 18 and 19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 20-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

The request filed on 5/27/03 for a Request for Continued Examination (RCE) under 37 CFR 1.114 based on parent Application No. 09/783,035 is acceptable and a RCE has been established. An action on the RCE follows.

Information Disclosure Statement

The information disclosure statement filed 7/12/02 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each U.S. and foreign patent; each publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered.

Claim Rejections - 35 USC § 112

Claims 22-25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

There is no support or antecedent for the limitation "Wherein a bandwidth of the N-layer is narrower than the bandwidth of the P-layer, potential barrier of a valance band of the N-layer is lower than a potential barrier of a conduction band of the P-layer" in claim 1. It is suggested to delete the above limitation.

Claim 22-25 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant

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art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Because the limitation "Wherein a bandwidth of the N-layer is narrower than the bandwidth of the P-layer, potential barrier of a valance band of the N-layer is lower than a potential barrier of a conduction band of the P-layer" in claim 1 contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 20-21 are rejected under 35 U.S.C. 102(b) as being anticipated by Nakamura et al. (U.S. Patent No. 5,578,839).

Referring to figure 1, Nakamura et al. teaches a method for producing a light-emitting semiconductor device comprising:

Forming a substrate (12, see figure 1, col. 5, lines 65-67),

Forming a buffer layer (14, see figure 1, col. 5, lines 65-67) on the substrate,

Forming an N-layer nitrogen-III Group compound semiconductor satisfying the formula $\text{Al}_x\text{Ga}_y\text{In}_{1-x-y}\text{N}$, inclusive of $x = 0$, $y = 0$, and $x = y = 0$ (16, see figure 1, col. 5, lines 14-24),

Forming a P-layer of P-type nitrogen-III Group compound semiconductor satisfying the formula $\text{Al}_x\text{Ga}_y\text{In}_{1-x-y}\text{N}$, inclusive of $x = 0$, $y = 0$, and $x = y = 0$ (20, see col. 5, lines 25-32), and

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Forming between the N-layer and the P-layer an intervening layer of nitrogen-III Group compound semiconductor satisfying the formula $Al_xGa_yIn_{1-x-y}N$ inclusive of $x = 0$, $y = 0$, and $x = y = 0$, the intervening layer being doped with a P-type dopant (18, see fig. 1, col. 5, lines 7-13).

Regarding to claim 21, the intervening layer comprises a Zn doped layer (see figure 1, col. 4, lines 60-65, and col. 5, lines 7-13).

Claims 22-25 are rejected under 35 U.S.C. 102(b) as being anticipated by Nakamura et al. (U.S. Patent No. 5,578,839).

Referring to figures 1-10, Nakamura et al. teaches a method for producing a light-emitting semiconductor device of a group III nitride compound, comprising:

Forming an N-layer of an N-type conduction (16, see figure 1, col. 5, lines 14-24), the N-layer comprising gallium nitride (16, It will be Gallium nitride when $y=1$),

Forming an emission layer of group III nitride compound semiconductor (18, see fig. 1, col. 5, lines 7-13) satisfying the formula, $Al_{x1}GaIn_{1-x1-y1}N$, where $0 \leq x1 \leq 1$, $0 \leq y1 \leq 1$, $0 \leq x1+y1 \leq 1$, on the N-layer (18),

Forming a P-layer of P-type conduction (20, see col. 5, lines 25-32), on the emission layer (18), said p-layer comprising aluminum gallium nitride satisfying the formula $Al_{x2}Ga_{1-x2}N$, where $0 < x2 < 1$.

Forming a contact layer of P-type conduction (34), on the P-layer, the contact layer comprising gallium nitride (see claim 19).

Wherein a bandwidth of the N-layer is narrower than the bandwidth of the P-layer, potential barrier of a valance band of the N-layer (16) is lower than a potential barrier of a conduction band of the P-layer (20).

Regarding to claim 23, the emission layer is doped with acceptor and donor impurities (18, see fig. 1, col. 5, lines 7-13).

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Regarding to claim 24, the contact layer of P-type conductivity (34) is formed between the P-type layer (20) and an electrode (26, see fig. 11).

Regarding to claim 25, forming an electrode (26) contacting the contact layer (34, see fig. 11).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanh Nguyen whose telephone number is (703) 308-9439, or by Email via address Thanh.Nguyen@uspto.gov. The examiner can normally be reached on Monday-Thursday from 6:30AM to 4:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr., can be reached on (703) 308-4940. The fax phone number for this Group is (703) 308-7722.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0956 (**See MPEP 203.08**).



Thanh Nguyen
Patent Examiner
Patent Examining Group 2800

TTN